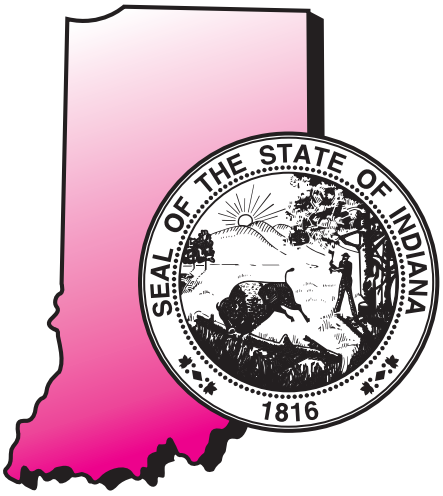
ISTEP+ Fall 2007

Indiana Statewide Testing for Educational Progress

Graduation Qualifying Exam
Applied Skills Assessment
Mathematics
Grade 10



Indiana Department of Education

Web Version

ISTEP+ Fall 2007

Indiana Statewide Testing for Educational Progress

Graduation Qualifying Exam
Mathematics

Use only a Number 2 pencil to respond to the questions in this book. Responses written in pen CANNOT be scored.

If you see this symbol, you may use your reference sheet to help solve the problem.

If you see this symbol, you may NOT use a calculator to solve problems in the test.

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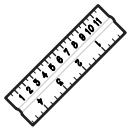
This symbol appears at the beginning of the sections that contain gridded-response problems.



If you see this symbol, use your ruler as a straightedge or to solve the problem.

If you see this symbol, use your protractor to solve the problem.

Test 1: Mathematics

Since you may receive partial credit for many of the problems, it is important to show ALL work in the spaces provided in this book. When you see the words **Show All Work,** be sure to

- **show all the steps needed to solve the problem**
- **make your handwriting clear and easy to read**
- **write the answer on the answer line**

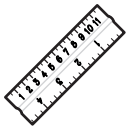
1 What are the slope, x-intercept, and y-intercept of the graph of the following equation?

$$y = \frac{1}{2}x - 6$$

Slope _____

***x*-intercept** _____

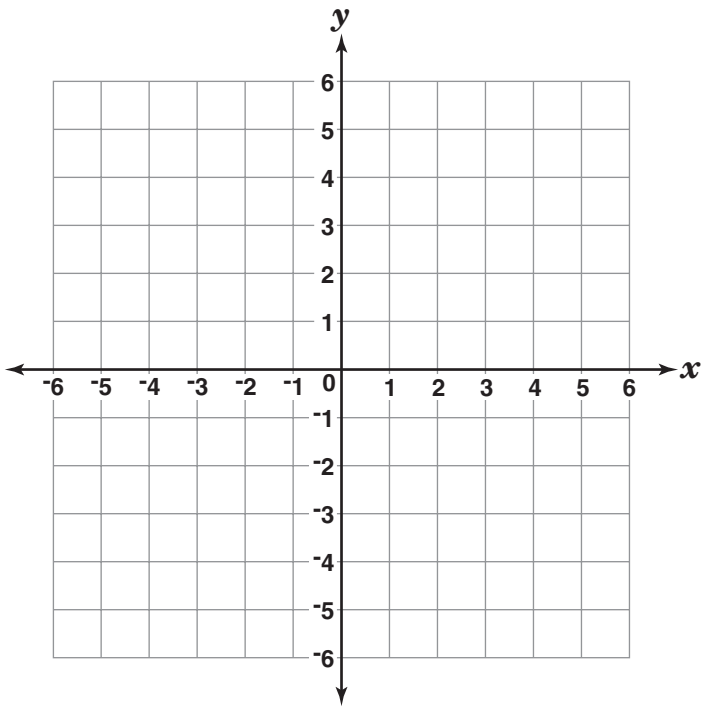
***y*-intercept** _____

2  Use your ruler as a straightedge.

Look at the following system of equations.

$$y = 2x + 4$$
$$y = {}^{-}x + 1$$

Graph the system of equations on the coordinate plane below.

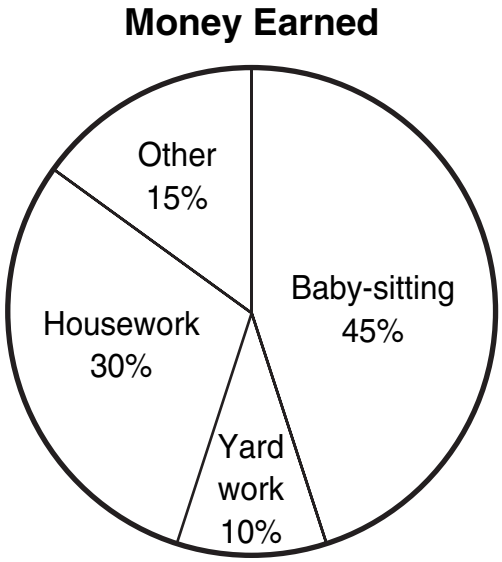


What is the solution to the system of equations in the graph? Write your answer on the line below.

Answer _____

Go On

3 Anna earns extra money by doing tasks for her neighbors after school. The circle graph below shows the percentage of money she earned for doing different tasks last week.



Last week, Anna earned a total of $85.

How much of this money did Anna earn from doing housework and yard work?

Show All Work

Answer $ _____

4 Solve for x: $x^2 + x - 6 = 0$

Show All Work

Answer $x =$ _____, or $x =$ _____

Go On

5 Cookies (c) and bottles of water (w) are sold at a snack bar. The cost of 4 cookies and 2 bottles of water is \$3.90 before tax. The cost of 3 cookies and 3 bottles of water is \$4.05 before tax.

On the lines below, write a system of equations that represents the information.

Equations _____

_____

Use the system of equations to determine the cost of 1 cookie and the cost of 1 bottle of water before tax. Write the answers on the lines below.

Show All Work

Cookie \$ _____

Bottle of water \$ _____

6 Joe needs 20.58 yards of fencing for the perimeter of his yard. The fencing costs $5.50 per FOOT.

ESTIMATE how much money Joe will spend on fencing.

Show All Work

Estimate $ _____

7 The cost of a medium pizza and the number of toppings on the pizza can be modeled by a linear equation. A medium pizza with no toppings costs $6.95. Megan orders a medium pizza with three toppings that costs $11.45.

Write an equation that gives the cost, y, of a medium pizza in terms of the number of toppings, x.

Show All Work

Equation _____

Go On

8 Consider the statement below.

For any rational number n, n^2 is always greater than n.

On the line below, give a value of n that is a counterexample to the given statement.

Show All Work

Answer $n =$ _____

STOP! STOP! STOP! STOP! STOP!

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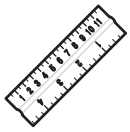

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Test 2: Mathematics

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1 Frank's Deli currently offers a choice of 2 types of bread, 5 types of meat, and 3 types of cheese on the menu. Frank plans to add another type of bread to the menu.

How many MORE combinations will be available after he adds the new type of bread?

Show All Work

Answer _____ combinations

2 Jenna covers her circular garden with mulch.

If the area she covers is 78.5 square feet, what is the radius, in feet, of the garden?

Show All Work

Answer _____ feet

Go On

3 Betty uses 1,980 yards of yarn when knitting a basic blanket. She then uses an additional 25 yards of yarn for each inch of the person's height who will receive the blanket.

Write an equation that represents the yards of yarn used (y) in relation to the height (h) of the person receiving the blanket.

Equation _____

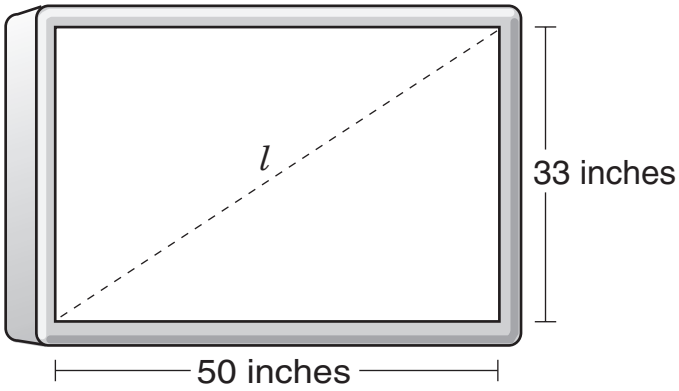
Betty used 11,040 FEET of yarn when making a blanket for Connie.

How tall, in INCHES, is Connie?

Show All Work

Answer _____ inches

4 The size of a television is determined by the length (l) of the screen's diagonal. The diagram below shows the dimensions of a rectangular television screen.



What is the length (l), in inches, of the screen's diagonal?

Show All Work

Answer _____ inches

Go On

5 Levi takes a taxi 13 miles to the airport. The taxi charges $1.50 per mile plus $0.20 per minute.

If the taxi travels at an average rate of 30 miles per hour, how much will the ride to the airport cost?

Show All Work

Answer $ _____

6 At a garden center, Pablo buys m bags of mulch for \$4.49 per bag and r bags of rock for \$5.79 per bag. The total cost is \$105.40 before tax.

Write an equation that represents this information.

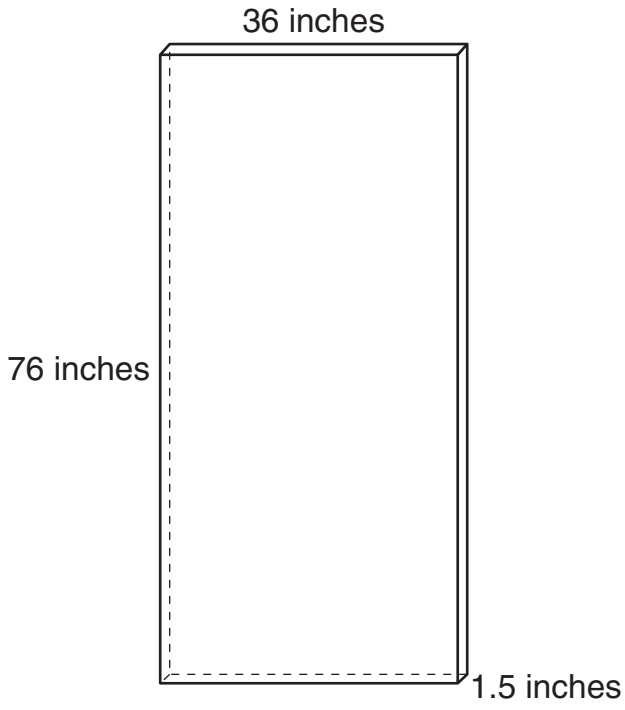
Equation _____

Pablo bought 8 bags of mulch. How many bags of rock did he buy?

Answer _____ bags of rock

Go On

7 A diagram of a door is shown below.



What is the total surface area, in square inches, of the door?

Show All Work

Answer _____ square inches

8 The length of a piano performance (P), in minutes, can be determined using the formula

$$P = \frac{nt}{M}$$

where n = number of beats per bar, t = number of bars in the music, and M = metronome marking.

Beth and Angie are performing piano solos at a concert. Beth's solo has 4 beats per bar and a metronome marking of 80. The ratio of the number of bars in Beth's solo to the number of bars in Angie's solo is 4 to 5.

If Angie's solo has 90 bars, what is the length, in minutes, of Beth's solo?

Show All Work

Answer _____ minutes

ATTENTION! Please do not leave your punchouts in this book.

STOP! STOP! STOP! STOP! STOP!

ISTEP+ Grade 9 and GQE Mathematics Reference Sheet

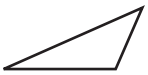
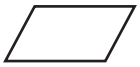
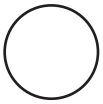
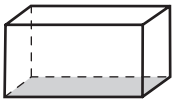
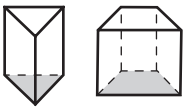
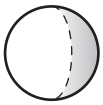
Shape	Formulas for Area (A) and Circumference (C)
Triangle 	$A = \frac{1}{2}bh = \frac{1}{2} \times$ base $\times$ height
Rectangle 	$A = lw =$ length $\times$ width
Trapezoid 	$A = \frac{1}{2}(b_1 + b_2) \times h = \frac{1}{2} \times$ sum of bases $\times$ height
Parallelogram 	$A = bh =$ base $\times$ height
Square 	$A = s^2 =$ side $\times$ side
Circle 	$A = \pi r^2 = \pi \times$ square of radius $C = 2\pi r = 2 \times \pi \times$ radius $\pi \approx 3.14$ or $\frac{22}{7}$

Figure	Formulas for Volume (V) and Surface Area (SA)
Rectangular Prism 	$V = lwh =$ length $\times$ width $\times$ height $SA = 2lw + 2hw + 2lh$ $= 2$(length $\times$ width) $+ 2$(height $\times$ width) $+ 2$(length $\times$ height)
General Prisms 	$V = Bh =$ area of base $\times$ height $SA =$ sum of the areas of the faces
Cylinder 	$V = \pi r^2 h = \pi \times$ square of radius $\times$ height $SA = 2\pi r^2 + 2\pi rh$ $= 2 \times \pi \times$ square of radius $+$ $2 \times \pi \times$ radius $\times$ height
Sphere 	$V = \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times$ cube of radius $SA = 4\pi r^2 = 4 \times \pi \times$ square of radius
Right Circular Cone 	$V = \frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times$ square of radius $\times$ height
Regular Pyramid 	$V = \frac{1}{3}Bh = \frac{1}{3} \times$ area of base $\times$ height

$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$

Equation of a Line

Slope-Intercept Form:

$y = mx + b$

where m = slope and $b = y$-intercept

Point-Slope Form:

$y - y_1 = m(x - x_1)$

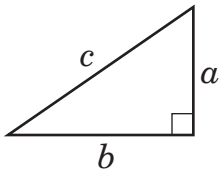
where m = slope and (x_1, y_1) is a point on a line

Slope of a Line

Let (x_1, y_1) and (x_2, y_2) be two points in the plane.

$$\text{slope} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \text{ where } x_2 \neq x_1$$

Pythagorean Theorem



$$a^2 + b^2 = c^2$$

Distance Formula

$$d = rt$$

where d = distance, r = rate, and t = time

Temperature Formulas

$°C = \frac{5}{9}(F - 32)$

$°\text{Celsius} = \frac{5}{9} \times (°\text{Fahrenheit} - 32)$

$°F = \frac{9}{5}C + 32$

$°\text{Fahrenheit} = \frac{9}{5} \times °\text{Celsius} + 32$

Simple Interest Formula

$$i = prt$$

where i = interest, p = principal, r = rate, and t = time

Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where $ax^2 + bx + c = 0$, $a \neq 0$, and $b^2 - 4ac \geq 0$

Conversions

1 yard = 3 feet = 36 inches
1 mile = 1,760 yards = 5,280 feet
1 acre = 43,560 square feet
1 hour = 60 minutes
1 minute = 60 seconds

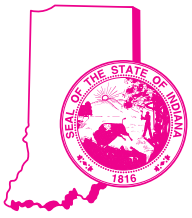
1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

1 liter = 1000 milliliters = 1000 cubic centimeters
1 meter = 100 centimeters = 1000 millimeters
1 kilometer = 1000 meters
1 gram = 1000 milligrams
1 kilogram = 1000 grams

1 pound = 16 ounces
1 ton = 2,000 pounds

CTB McGraw-Hill

Graduation Qualifying Exam
Mathematics



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